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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MALDONADO, JULIO J	
ART UNIT	**PAPER NUMBER**
2823	

DATE MAILED: 06/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/822,563	ACIKEL ET AL.	
	Examiner	Art Unit	
	Julio J. Maldonado	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) *11,12,25 and 30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,13-20,22-24 and 26-29* is/are rejected.

7)☒ Claim(s) *21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20050812 20040702*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of claims 1-10, 13-24 and 26-29 in the reply filed on 04/11/2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-8, 10, 13, 14, 16, 17, 19, 20, 22-24 and 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata (U.S. 2004/0087082 A1) in view of Olewine et al. (U.S. 2003/0067023 A1).

In reference to claims 1, 10, 22, Nakata (Figs.2A-2F) teaches a method of forming a MIM capacitor including the steps of forming a platinum bottom electrode (3) supported by a substrate (1), including forming a lateral shape of the bottom electrode; forming a silicon nitride thin film dielectric region (5) over the bottom electrode (3), including producing silicon nitride material over the bottom electrode (3) only after the lateral shape of the bottom electrode (3) is formed; and forming a top electrode (6) over the silicon nitride thin film dielectric region (5) (Nakata, [0018] – [0026]).

Nakata fails to teach wherein the thin film dielectric region is made of BST. However, Olewine et al. teach a method of forming a MIM capacitors including forming a lower electrode, a thin film dielectric region and a top electrode, wherein said thin film dielectric region is made from a material selected from the group including silicon nitride, tantalum oxide and BST (Olewine et al., [0008]).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Nakata and Olewine et al. to enable forming the thin film dielectric region of Nakata using the materials according to the teachings of Olewine et al. because one of ordinary skill in the art at the time the invention was made would have been motivated to look to alternative suitable methods of forming the disclosed thin film dielectric region of Nakata and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

In reference to claims 2, 4, 5, 13, 23, 28, the combined teachings of Nakata and Olewine et al. teach wherein the step of forming a bottom electrode supported by a substrate comprises forming a lift off mask over the substrate, the lift off mask defining the lateral shape of the bottom electrode; depositing a layer of bottom electrode material over the lift off mask; and removing the lift off mask, thereby forming the lateral shape of the bottom electrode (Nakata, [0018] – [0026]).

In reference to claims 3, 6-8, 14, 16, 24, 26, 27, the combined teachings of Nakata and Olewine et al. teach wherein the step of forming a lift off mask over the substrate comprises depositing a photoresist lift off mask over the substrate; and the step of depositing a layer of bottom electrode material over the lift off mask comprises

depositing a platinum layer and a gold layer over the photoresist lift off mask (Nakata, [0018] – [0026]).

In reference to claims 17, 19, 20 and 29, the combined teachings of Nakata and Olewine et al. teach forming a passivation structure over the BST tin film dielectric region, including producing a passivation material over the BST material only after the top electrode material is produced over the BST material, wherein the passivation material is made of silicon nitride (Nakata, [0018] – [0026]).

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata (U.S. 2004/0087082 A1) in view of Olewine et al. (U.S. 2003/0067023 A1) as applied to claims 1-8, 10, 13, 14, 16, 17, 19, 20, 22-24 and 26-29 above, and further in view of Nishioka et al. (U.S. 5,489,548).

The combined teachings of Nakata and Olewine et al. substantially teach all aspects of the invention but fail to disclose wherein the bottom electrode consist essentially of a conductive oxide. However, Nishioka et al. teach a method of forming a high dielectric constant capacitor including forming a bottom electrode, a BST dielectric region, and a top electrode, wherein said electrode are made from a group of material including platinum and conductive oxides (Nishioka et al., column 9, lines 7 – 23).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Nakata and Olewine et al. with Nishioka et al. to enable forming the bottom electrode of the combination of Nakata and Olewine et al. using the materials according to the teachings of Nishioka et al. because one of ordinary skill in the art at the time the invention was made would have been motivated to look to alternative

suitable methods of forming the disclosed bottom electrode of Nakata and Olewine et al. and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata (U.S. 2004/0087082 A1) in view of Olewine et al. (U.S. 2003/0067023 A1) as applied to claims 1-8, 10, 13, 14, 16, 17, 19, 20, 22-24 and 26-29 above, and further in view of Nishioka et al. (U.S. 5,489,548) and Moslehi (U.S. 5,273,609).

The combined teachings of Nakata and Olewine et al. substantially teach all aspects of the invention but fail to disclose techniques to form the electrode layers and the BST layer. However, Nishioka et al. in a related method to form a high dielectric constant capacitor teach forming platinum layers and BST layers using chemical vapor deposition (Nishioka et al., column 5, line 58 – column 6, line 39). It would have been within the scope of one of ordinary skill in the art to combine the teachings of Nakata and Olewine et al. with Nishioka et al. to enable the deposition step of Nakata and Olewine et al. to be performed according to the teachings of Nishioka et al. because one of ordinary skill in the art at the time the invention was made would have been motivated to look to alternative suitable methods of performing the disclosed deposition step of Nakata and Olewine et al. and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

Still the combination of Nakata, Olewine et al., and Nishioka et al. fail to teach wherein step of forming a layer of top electrode material over the BST thin film material comprises depositing a platinum layer over the BST thin film material, wherein

deposition of the platinum layer occurs in a same processing chamber as production of the BST thin film material, and without interim removal of the BST parallel plate capacitor from the processing chamber. However, Moslehi teach a deposition process, wherein said process is performed in a multi-step processing system and wherein multiple thin layers can be deposited in situ (column 7, line 60 – column 8, line 9). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Nakata, Olewine et al. and Nishioka et al. with Moslehi to enable forming the layers of Nakata, Olewine et al. and Nishioka et al. in the processing system of Moslehi for the further advantage of reducing processing time (column 6, lines 36 – 47).

6. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata (U.S. 2004/0087082 A1) in view of Olewine et al. (U.S. 2003/0067023 A1) as applied to claims 1-8, 10, 13, 14, 16, 17, 19, 20, 22-24 and 26-29 above, and further in view of Evans, Jr. et al. (U.S. 5,593,914).

The combined teachings of Nakata and Olewine et al. substantially teach all aspects of the invention but fail to disclose wherein the passivation layer is silicon oxide. However, Evans, Jr. et al. (Figs.1-8) in a related method to form a MIM capacitor teach the steps of forming a bottom electrode (31), a dielectric layer (33), and a top electrode (34) on a substrate (12); and forming a passivation layer (40) over the top electrode (40), wherein said passivation electrode is made of silicon oxide (Evans, Jr. et al., column 2, line 53 – column 4, line 42). It would have been within the scope of one of ordinary skill in the art to combine the teachings of Nakata and Olewine et al. to enable

forming the passivation layer of Nakata and Olewine et al. using the materials according to the teachings of Evans, Jr. et al. because one of ordinary skill in the art at the time the invention was made would have been motivated to look to alternative suitable methods of forming the disclosed passivation layer of Nakata and Olewine et al. and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

Allowable Subject Matter

7. Claim 21 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fails to teach annealing the BST thin film dielectric region only after the top electrode material is produced over the BST material.

Conclusion

9. Applicants are encouraged, where appropriate, to check Patent Application Information Retrieval (PAIR) (http://portal.uspto.gov/external/portal/pair) which provides applicants direct secure access to their own patent application status information, as well as to general patent information publicly available.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571) 272-1907. The fax number for this group is 571-273-8300. Updates can be found at http://www.uspto.gov/web/info/2800.htm.

Julio J. Maldonado
Patent Examiner
Art Unit 2823

Julio J. Maldonado
June 12, 2006

GEORGE R. FOURSON
PRIMARY EXAMINER